VESSEL SURFACE RECONSTRUCTION WITH A TUBULAR DEFORMABLE MODEL

ABSTRACT

An apparatus, article of manufacture, and method for modeling an elongated object located internal to a body (e.g., blood vessels such as the carotid artery or the renal artery). Magnetic resonance data of the area of concern is collected. The magnetic resonance data is analyzed, extracting gradient information. The extracted gradient information may include the gradient of the magnitude gradient. Contemporaneously, a tubular coordinate system is interactively generated as an initial model of the artery. An axis and a reference circumferential direction are defined for the coordinate system with radial lines extending outward from the axis. Intersecting radial lines are merged. All vertices at radial and circumferential positions are initialized with the extracted gradient information. Then, the initialized model is deformed subjecting initialized vertices to image and smoothing forces, thereby completing the surface model of the artery, effectively reconstructing the artery surface. The reconstructed artery surface may be displayed on a display.